CRASHWORTHINESS RESEARCH NEWS

Volume 2, Number 1 **July 1997**

NATIONAL TRANSPORTATION BIOMECHANICS RESEARCH CENTER'S (NTBRC'S) THOR ADVANCED DUMMY TRAVELS TO JAPAN

In early April, as part of a cooperative research agreement between the Office of Crashworthiness Research and the Japan Automobile Research Institute (JARI), the THOR advanced frontal dummy traveled to Japan for test and evaluation with reference to the current Hybrid III dummy. Mark Haffner, NTBRC Advanced Dummy Program Manager, was on site to participate in preparations for all THOR tests, as was Dr. N. Rangarajan, President of GESAC, Inc., the advanced dummy contractor.

A total of 10 tests was conducted, evenly divided between Hybrid 3 and THOR, in airbag, 3 point belt, and belt + bag environments. All tests were conducted at 30 mph, with a rather stiff crash pulse (30 g, 90 ms). The tests at JARI went very smoothly, largely due to the highly professional JARI staff led by Mr. Koshiro Ono, Project Director and Executive Chief of Research.

THOR and Hybrid 3 data obtained during this test series is now being fully analyzed, but early indications are that the THOR prototype proved to be quite robust. A full data set was obtained from each THOR test, including 3D information on thoracic displacement at four locations on the anterior ribcage. This displacement data exhibits a unique signature for each restraint type, as expected.

Additional international evaluation of the THOR design is now in progress at Volvo and at Autoliv Research in Sweden, and will be followed by evaluation by an EEVC consortium in Europe this fall (TRL, the University of Madrid, and TNO). Early next year, it is likely that THOR will travel to Australia for evaluation by a partnership between the Federal Office of Road Safety (FORS) and Autoliv Australia.

NHTSA STAFF VISITS BALTIMORE'S SHOCK TRAUMA CENTER

Randa Radwan Samaha , Office of Crashworthiness Research, Faris Bandak, National Transportation Biomechanics Research Center, and Maria Vegega, Division Chief, Safety Countermeasures, Traffic Safety Programs. joined NHTSA Administrator Dr. Ricardo Martinez for a June 21 visit to the R. Adams

Cowley Shock Trauma Center in Baltimore to observe emergency room procedures.

The visit was part of an ongoing effort by NHTSA to provide staff members with first hand knowledge on the trauma experienced in automotive crashes. The goal is to foster the dialogue between NHTSA engineers, lawyers, and data analysts and emergency room physicians and other medical staff in identifying injury trends and correlating these injury patterns with specific crash dynamics and patterns.

Co-hosts were Dr. Andy Burgess, R. Adams Cowley Shock Trauma Center and Dr. Pat Dischinger, National Study Center for Trauma and EMS.

The event was covered by CBS news and aired on "CBS World News Tonight" on July 5.

PNGV RESEARCH ACTIVITIES

The Office of Crashworthiness Research was funded by Congress this year to participate in the Partnership for a New Generation of Vehicles (PNGV) program.

NHTSA's participation in this program is to develop tools and techniques to evaluate the compatibility of the lightweight PNGV vehicles with the rest of the existing US automotive fleet. Additionally NHTSA will develop a methodology for estimating the overall injury assessment for a US fleet consisting of a mix of current and PNGV vehicles. In support this effort, a series of finite element models are being developed to assess the compatibility of the PNGV designs with the existing vehicle types.

A consortium of government, industry, and university researchers has been established in order to develop and validate the finite element models for the various vehicles. These models will then be used to simulate a wide variety of accident modes and collision pairs (e.g. impact with a small car, large car, van, etc). From these models a more complete safety estimate can be developed that evaluates not only the safety of the occupants of PNGV vehicles, but also the increased safety of the other vehicles in the fleet from impacting lightweight PNGV vehicles.

IHRA VEHICLE COMPATIBILITY MEETING

At the Fifteenth Enhanced Safety of Vehicles Conference held in Melbourne, Australia, during May 1996, a program of coordinated research was agreed upon that would be undertaken under the worldwide banner of International Harmonized Research Activities (IHRA).

The research is to be comprised of six high priority areas in which nations would collaborate over a 5 year period. These include research into biomechanics, intelligent transportation systems, vehicle compatibility, advanced frontal offset crash protection, pedestrian impact protection, and functional equivalency of motor vehicle regulations.

In the field of crashworthiness, it was recognized that the separate regulations on frontal and side impact do not address the problems of vehicle compatibility. Programs in this research area are active in a number of countries including the United States, and it was agreed that international coordination of this work would be beneficial. The aim of this coordinated work is to develop internationally agreed upon test procedures designed to improve the compatibility of car structures in front-to-front and in front-to-side impacts,

thus enhancing the level of occupant protection provided in these crash modes. A subsidiary aim is to consider the protection in impacts with pedestrians, heavy vehicles, and other obstacles.

Dr. Tom Hollowell traveled to Crowthorne, England, to participate in the first meeting of the IHRA Vehicle Compatibility Working Group, chaired by Mr. Keith Rodgers of the United Kingdom's Department of Transport. Dr. Hollowell presented the status of the research being undertaken by NHTSA, while Mr. Eberhart Faerber of BASt presented the status of the research being undertaken by the European Experimental Vehicle Committee's Working Group 15-Vehicle Compatibility.

NHTSA STAFF MEMBER PARTICIPATES IN ISO WORKING GROUPS

The ISO (International Standards Organizations) has technical working groups that address several areas of crashworthiness research.

Randa Radwan Samaha participated in the June meetings of the ISO Working Groups on Test Procedures for Car Collisions, on Test Procedures for Evaluating Vehicle Occupant Interactionswith Deploying Air Bags, and on Anthropomorphic Test Devices. The meetings were hosted by TNO Road-Vehicles Research Institute in the Netherlands.

Randa is the program leader of the Advanced Side Crash Research Program and is the co-leader of the agency team on Side Impact Harmonization in which she is overseeing a series of vehicle crash tests conducted to the European Side Impact directive. In these capacities, she participated in the Working Groups discussions on characterization of European side impact barriers, side impact pole test procedure, development of harmonized side impact dummy and test procedures for evaluation occupant interaction with deploying side impact air bags.

Randa also participated in meetings with TNO and industry staff to discuss proposed EUROSID-1 dummy modifications and present up-to-date agency experiences with EUROSID-1 certification issues.

AIR BAG SYSTEMS TASK FORCE/SAE INFLATABLE RESTRAINTS STANDARDS COMMITTEE MEETING

Lori Summers from the Office of Crashworthiness Research attended the Air Bag Systems Task Force meeting and the SAE Inflatable Restraints Standards Committee on February 25, 1997 in Detroit, Michigan. The majority of the Air Bag Systems Task Force meeting concentrated on developing system-level testing and evaluation of air bag deployment noise.

A presentation was made by Dr. Richard Price from Aberdeen Proving Grounds on his development work of an analytical human ear model for ear injury prediction. Dr. Price made an on-screen demonstration on how to use the analytical program, and welcomed the opportunity to work with the committee.

Dr. Stephen Rouhana, from General Motors, offered to write up a straw-man recommended practice for measuring air bag deployment noise based on his published 1994 work. Upon review of the straw-man recommended practice, and the analytical ear injury prediction model, the committee will be

recommending a plan for future testing at the next meeting.

Other Air Bag Systems Task Force issues that were discussed included an update of the air bag burn experiments conducted by Matthew Reed at UMTRI. Matthew was not in attendance at the meeting; however, the committee was informed that Matthew had a few months of work left to complete on this initial study of convective burns. Some committee members suggested a continuation of his study to look at conductive burns, since some suppliers were moving toward air bag designs without vent holes. The committee decided to continue further air bag burn discussions at the next meeting.

It was also announced at the meeting that the J1794 Restraint Systems Effluent Test procedure was published on December 12, 1996. This SAE recommended practice describes a method to identify, and quantify effluent resulting from deployment of in-vehicle stored energy restraint systems.

The SAE Recommended Practice J1855 entitled "Disposal of Electrically Activated Automotive Air Bags" was also due for a five year ballot review; the committee members agreed that action should be taken to update this document.

ADVANCED AIR BAG TECHNOLOGY ASSESSMENT

A Memorandum of Understanding (MOU) has recently been signed between the National Highway Traffic Safety Administration (NHTSA) and the National Aeronautics and Space Administration (NASA) to provide an assessment of advanced air bag technology. NASA's expertise in advanced technology development including sensors, microelectronics, propulsion technologies, and system analysis will significantly contribute to NHTSA's knowledge and research in motor vehicle safety restraint systems and biomechanics.

The Jet Propulsion Laboratory (JPL) has been selected by NASA to conduct the Advanced Air Bag Technology Assessment, and the study's primary focus will be to identify advanced air bag technology that can be applied to the elimination of the adverse effects of air bag deployment while maintaining effective crash protection. Work will involve: understanding and defining critical parameters affecting air bag performance; systematically assessing air bag technology state-of-the-art and its future potential; and identifying new concepts for air bag systems.

On February 11, 1997, JPL made an presentation at NHTSA's Smart Air Bag Public Meeting announcing the new cooperative research efforts with NHTSA and it's role, and on February 19th, JPL was further introduced to air bag suppliers at NHTSA's Vehicle Research and Test Center.

ACCOMPLISHMENTS AND U P C O M I N G EVENTS

ACCOMPLISHMENTS

CONTRACTOR'S FINAL REPORT AVAILABLE

Carl Ragland accepted delivery of a University of Virginia final contract report entitled "Airbag Interaction with and Injury Potential from Common Steering Control Devices". The report (DOT HS 808 580) is available through NTIS, 5285 Port Royal Road, Springfield, VA 22161, Phone: 703-487-4650.

UPCOMING EVENTS

August 6 — Retirement Party - Ralph J. Hitchcock, Director, Office of Crashworthiness Research, Ft. McNair Officers Club Washington, D.C.

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Rita Gibbons
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August 20 — MVSRAC Crashworthiness Subcommittee Meeting - DOT, 400 Seventh Street, S.W. Washington, D.C. - Room 8236 10:00 a.m.

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CREDITS

This is the fourth issue of an informal newsletter that R&D's Office of Crashworthiness Research publishes periodically on their activities.

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